

Appendix G
ACCESS ROAD OPTIONS ASSESSMENT

9 November 2023

Laura Jeffrey
Associate Director, Development
Recurrent Energy
laura.jeffrey@recurrentenergy.com

Re: Sundown Solar Farm - Site Access Comparison from Gwydir Highway

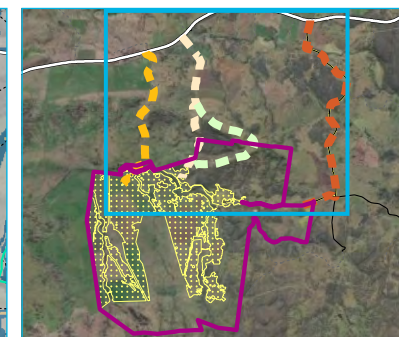
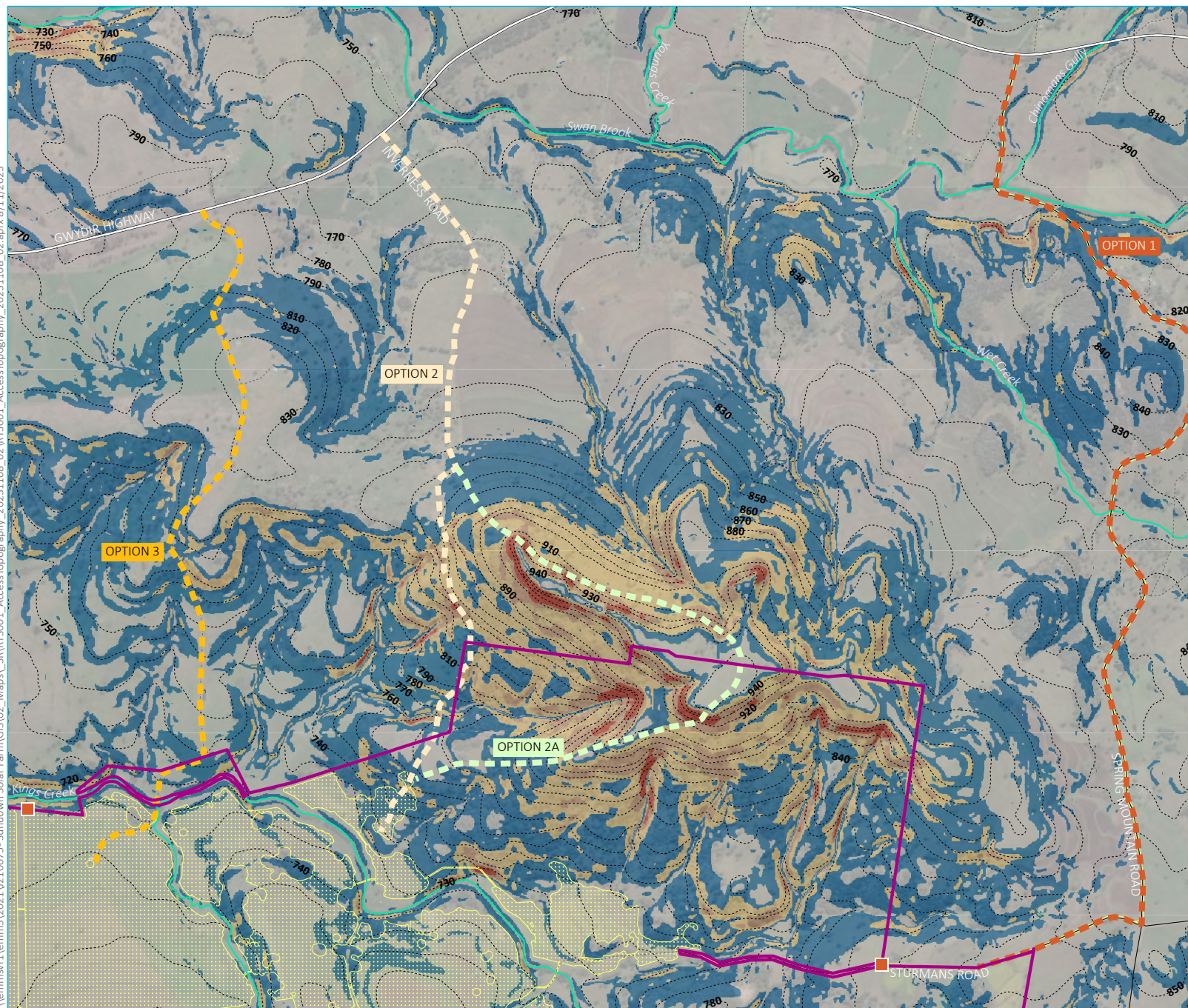
Dear Laura,

This letter undertakes a comparison of the proposed site access with other two potential site accesses, which have been raised in submissions from the local community for the Sundown Solar Farm, namely:

- Option 1 (proposed): Gwydir Highway, then Spring Mountain Road, then Sturmans Road
- Option 2/Option 2A (raised by the community): Gwydir Highway, then Inverness Road, then a new road to be constructed through the private property
- Option 3 (raised by the community): Gwydir Highway (at number 3958 Gwydir Highway), then an unnamed public road to the site access, named as 'substation access track' for this project.

These options are shown in Figure 1 and are discussed in Table 1.

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- KEY**
- Proposed Sundown Solar Farm (Project area)
 - Conceptual disturbance footprint
 - Emergency exit point
 - Proposed access route
 - Option 1: Spring Mountain Road/ Sturmans Road
 - Option 2: Inverness Road
 - Option 2a: Inverness Road
 - Option 3: Substation access track, off 3,598 Gwydir Hwy
 - Slope (degrees)**
 - 0- 5
 - 5- 10
 - 10- 15
 - 15- 20
 - > 20
 - Existing environment**
 - Major road
 - Minor road
 - Vehicular track
 - Named watercourse
 - Topographic contour (10 m)

Proposed access topography

Sundown Solar Farm
Response To Submissions
Figure 2.1



Source: EMM (2023); Canadian Solar (2023); DCSSS (2023); GA (2011); DFSE (2017)

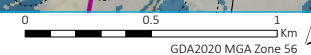


Table 1 Haulage route access comparison from Gwydir Highway

Aspect	Option 1	Option 2/Option 2A	Option 3
Route length	Approximately 6.63 km	Approximately 4.20 km	Approximately 4.20 km
Road width	Approximately 4 m, narrowing to approximately 2-3 m closer to the site. Road would require widening to 7 to 8 m.	Inverness Road is approximately 4 m wide and approximately 1 km long. The remainder of the proposed route does not yet exist. The existing road would require widening and new road of approximately 3 km would need to be constructed through a private property at a width of 7 to 8 m.	This is an unnamed Council road which provides access to a private property with a road width of approximately 4 m. Road would require widening to 7 to 8 m.
Gradient of route	Undulating, but suitable for heavy vehicle access.	Portions of the route have excessive gradient greater than 10% and may be unsuitable for heavy vehicle access. Any gradient over 10% will have drainage issues during wet conditions. Steep grades are sometimes managed using zig zags (switch back), however applying this on such a short span of road is not desirable as it will require frequent turns by opposing heavy vehicles. Road widening will be required in each turn to facilitate two-way movements of heavy vehicles. An engineering assessment of the gradient for this option is presented in Appendix A.	Favourable gradient for approximately 2 km from Gwydir Highway. Steeper gradients closer to the site makes this option unlikely to be suitable for heavy vehicles.
Gradient of Gwydir Highway intersection	Flat (Plate 3)	Flat (Plate 4)	Flat (Plate 7)
Distance from Glenn Innes to Gwydir Road intersection	30 km	34.5 km	35.5 km
Distance from Inverell to Gwydir Road intersection	37.5 km	33 km	32 km

Table 1 **Haulage route access comparison from Gwydir Highway**

Aspect	Option 1	Option 2/Option 2A	Option 3
Requirement to widen Gwydir Highway intersection to accommodate turning of heavy vehicles (subject to swept path assessment)	Will be required.	May be required.	Will be required.
Requirement to construct a Short Channelised Right Turn CHR (S) at Gwydir Highway intersection	Yes	Yes, existing BAR would need to be upgraded to CHR (S) (Plate 5).	Yes
Requirement to construct Basic Left Turn (BAL) at Gwydir Highway intersection	Yes	Yes	Yes
Sight distance at Gwydir Highway intersection (heading out from site)	Sight distance to the right is adequate (Plate 1) but sight distance to the left is poor due to the moderate bend (Plate 2). Notably, the existing intersection has non-conforming sight distance to the left.	Sight distances are adequate on both left and right as the intersection is located at a straight alignment of Gwydir Highway (Plate 6)	Sight distance to the right does not meet the relevant Austroads guideline due to the existing vertical curve, an existing tree and sign post (Plate 8) but sight distance is adequate to the left (Plate 9).
Traffic volume at Gwydir Highway intersection	Low	Low	Low (currently gate controlled)
Pavement material	The first 20–30 m of Spring Mountain Road is bitumen, and the remainder of the route is dirt/rubble (Plate 3).	Inverness Road begins with gravel then the remainder is dirt/rubble (exact distances are unknown). The next 2–3 km of the proposed route has not yet been constructed.	Gravel road
Stock grates	Stock grates traverse the road at several points. There will be a need for stock grates to be reinstated as part of the road upgrade.	The presence of stock grates is not known.	The presence of stock grates is not known.

Table 1 **Haulage route access comparison from Gwydir Highway**

Aspect	Option 1	Option 2/Option 2A	Option 3
Potential to share upgrade cost with GoldWind Australia as part of the White Rock Wind Farm project	Yes	No	Unlikely. GoldWind is proposing to direct 70% of its construction traffic for the eastern section of its transmission line and OSOM vehicles for its substation through this access. It is required under its consent conditions to only upgrade the property access to a Typical Rural Property Access with no requirement for an intersection upgrade.
Dilapidation survey and upgrades	As the route is on Council owned road, there will be a need to undertake a dilapidation survey at the commencement and completion of the project and to undertake upgrades/repairs as required.	As the route is largely on privately owned land, there will not be a regulatory need to undertake periodic dilapidation surveys or to undertake upgrades/repairs as required.	As the route is an unnamed Council road, there will be a need to undertake a dilapidation survey at the commencement and completion of the project and to undertake upgrades/repairs as required.
Water crossings	4–5 crossings. Existing culverts/bridges will need to be replaced.	Number of crossing unknown, but likely to be fewer than option 1.	A known crossing over Kings Creek/Jessie Creek. Potentially more, subject to survey.
Road alignment	Good. Road alignment is at a 90 degree angle from the highway (approximately). The remainder of the road has moderate bends that are suitable for heavy vehicle access.	Good. Road alignment is at a 90 degree angle from the highway (approximately). The remainder of the road has moderate bends that are suitable for heavy vehicle access.	Poor. Road alignment is at a 45 degree angle from Gwydir Highway (approximately). This angle would create sight distance issues to the right for the exiting drivers. The remainder of the road has sharp bends that may be unsuitable for heavy vehicular turnaround, unless the road is widened adequately.
Potential to source material from onsite quarry, pending suitability and approval	Yes	Yes	Yes



Plate 1 **Sight distance to the right (option 1)**



Plate 2 **Sight distance to the left (option 1)**



Plate 3 **Option 1, showing Spring Mountain Road on approach to Gwydir Highway**



Plate 4 **Option 2, showing Inverness Road at Gwydir Highway intersection**



Plate 5 **Option 2, showing BAR at Gwydir Highway/Inverness Road intersection**



Sight distance to the right



Sight distance to the left

Plate 6 **Option 2, showing sight distance from Inverness Road to Gwydir Highway**



Plate 7 **Option 3, showing unnamed road from Gwydir Highway**



Plate 8 **Sight distance to the right (option 3)**



Plate 9 Sight distance to the left (option 3)

Conclusion

Three options for access routes have been assessed. The assessment has considered a number of criteria including but not limited to safety, compliance with applicable guidelines and the potential to provide a long-term benefit to the local community.

The assessment determined that Option 1 is the most suitable option. Option 1 will comprise an upgrade of the Gwydir Highway/Spring Mountain Road intersection, Spring Mountain Road and Sturmans Road and the associated water crossings to meet applicable guidelines. Notably, the intersection upgrade would also rectify the existing non-conforming sight distance to the left. These upgrades will considerably improve the long-term safety and accessibility of road users in the local community.

Option 2/2A is the least favourable option primarily due to the presence of steep gradients which make the route unsafe for heavy vehicle access (Appendix A). Because most of Option 2/2A would need to construct a new road on the alignment of a private access track, its potential upgrade would not provide the long-term safety and accessibility benefits that Option 1 will, as members of the general public would not have access to using it. Similarly, because Option 2/2A is a private road there would not be a requirement for the road to be maintained in the longer term.

Option 3 is also not suitable for use due to the presence of uneven topography, potentially steep gradients and non-conforming sight distance on Gwydir Highway to the right. The angle of the road from the highway turnoff is approximately 45 degrees, which would make manoeuvring of heavy vehicles difficult. As with Option 2/2A, the upgrade of Option 3 will not bring any public benefit.

Option 1 is the most feasible from a safety, accessibility and community benefit perspective.

Should you have any questions or comments, please don't hesitate to contact me on 0425 478 650.

Yours sincerely,



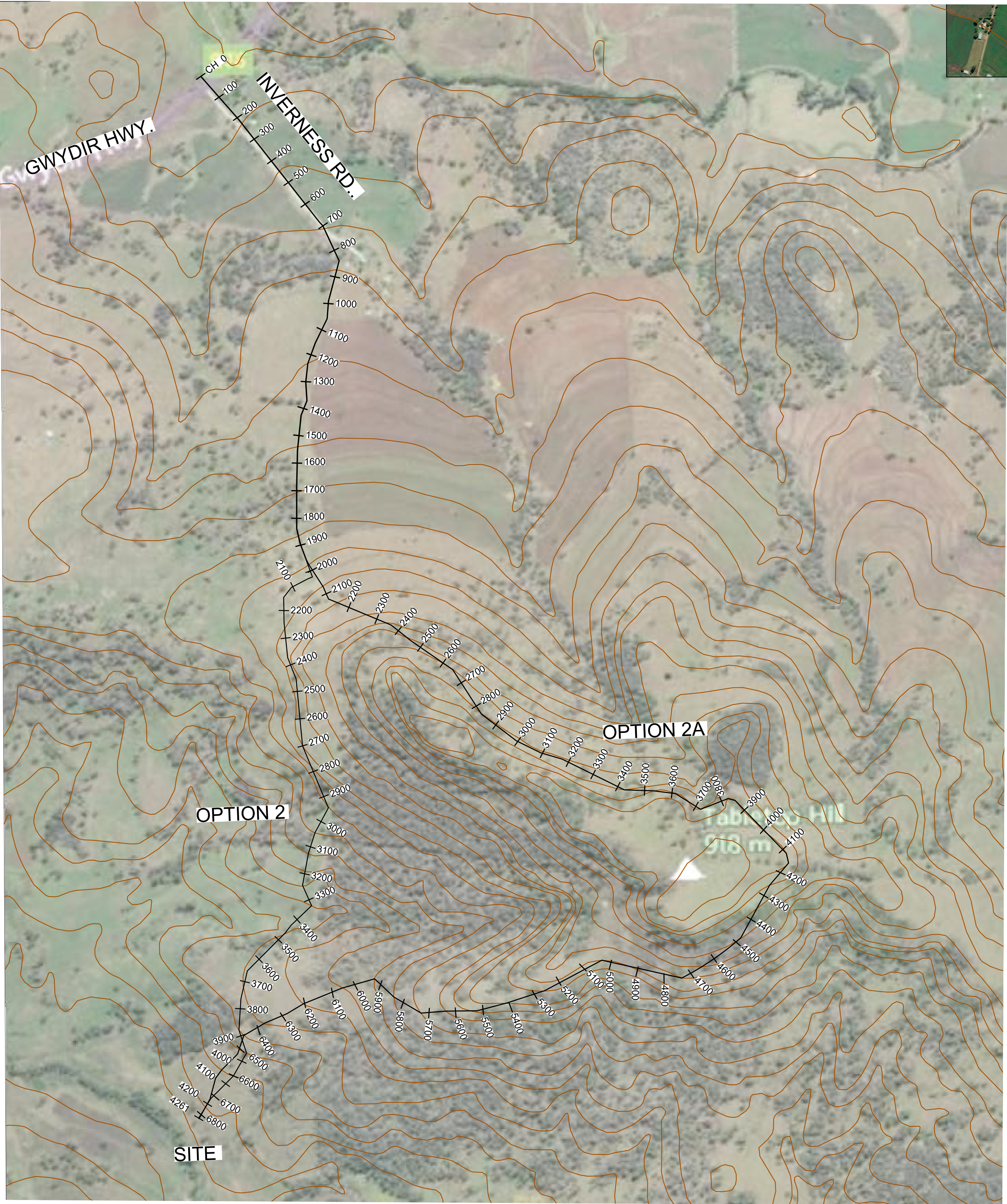
Abdullah Uddin

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Appendix A

Option 2/2A gradient assessment

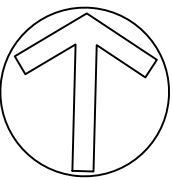


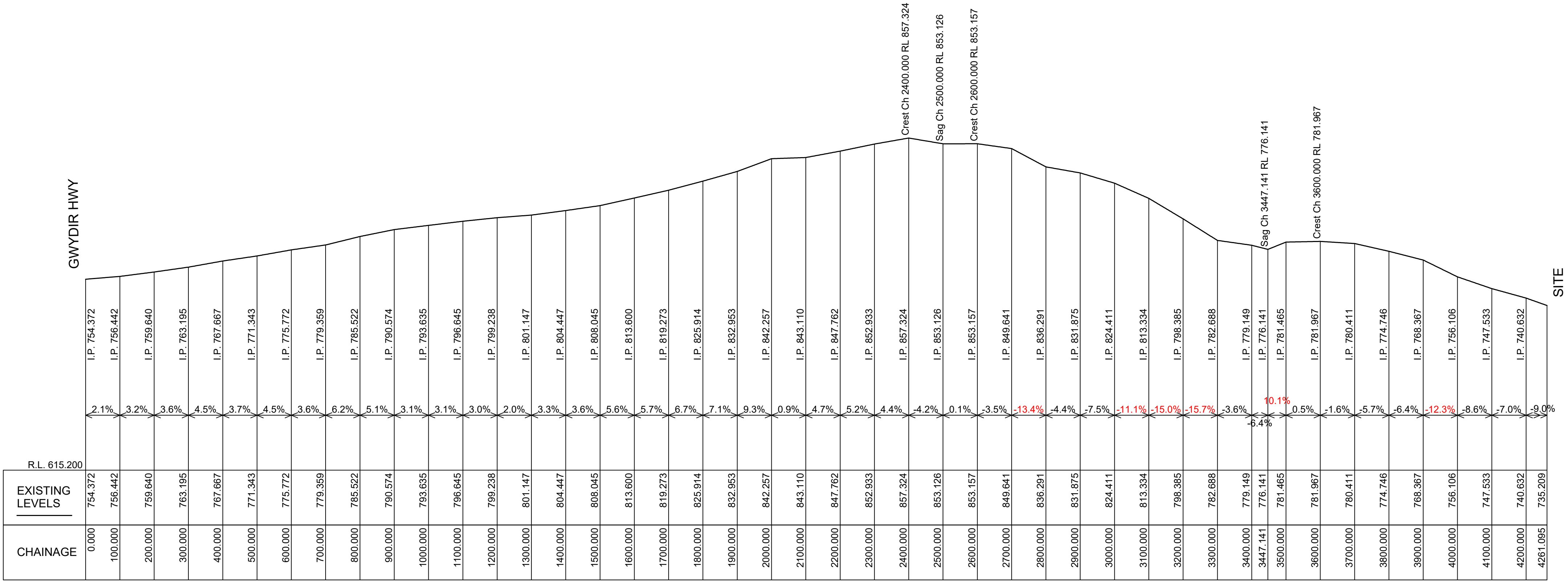
PLAN
SCALE 1:1000
CONTOUR INTERVAL 10m

SHEET INDEX		
SHEET No	REV	DESCRIPTION
C01	-	ACCESS OPTIONS 2 & 2A PLAN
C02	-	LONGITUDINAL SECTION OPTION 2.
C03	-	LONGITUDINAL SECTION OPTION 2A.



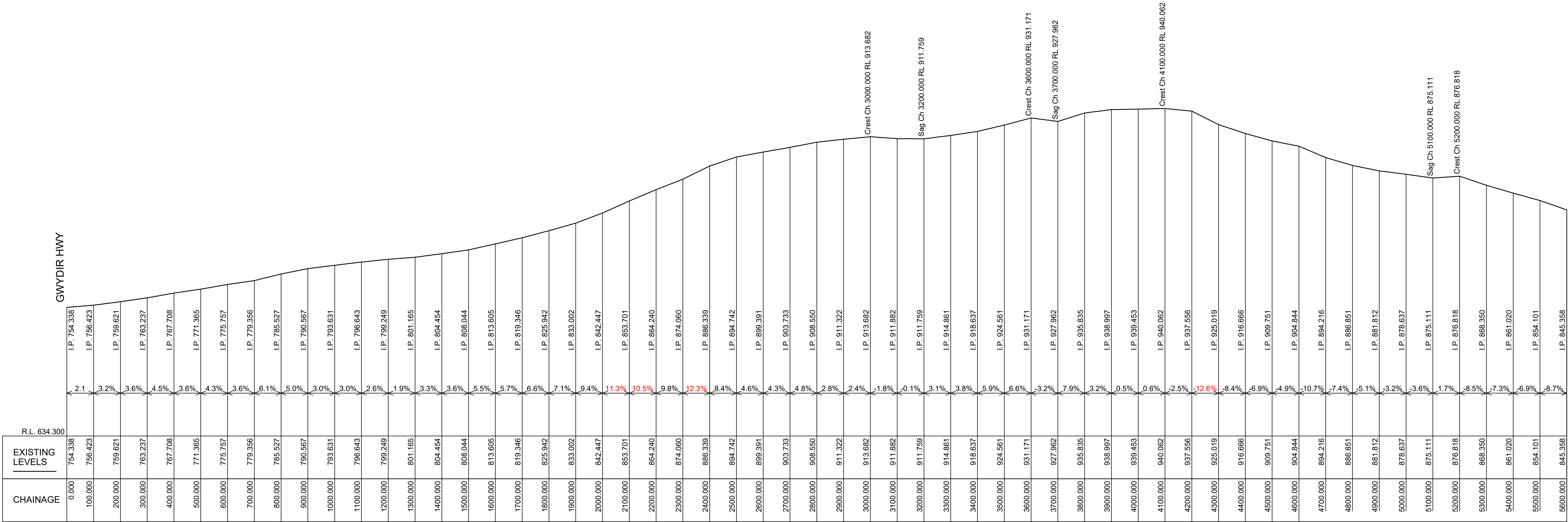
NOT FOR CONSTRUCTION

 SYDNEY Suite 01 Ground Floor 20 Chandos Street, St Leonards NSW 2065 Phone # 02 9493 9500 www.emmconsulting.com.au	REV	DATE	COMMENT	DRAWN	REVIEWED	REV	DATE	COMMENT	DRAWN	REVIEWED		PROJECT: GWYDIR Hwy & INVERNESS ROAD, SWAN VALE - NSW. ACCESS OPTIONS	DRAWING TITLE: ACCESS OPTIONS 2 & 2A PLAN	CLIENT: Sundowner Solar Pty Ltd	
														DRG. #: EMM - C01	REV: -
														PROJECT #: J210075	
														SCALE: AS SHOWN	
	-	1/10/23	FOR COMMENT	C.J.	A.U.										

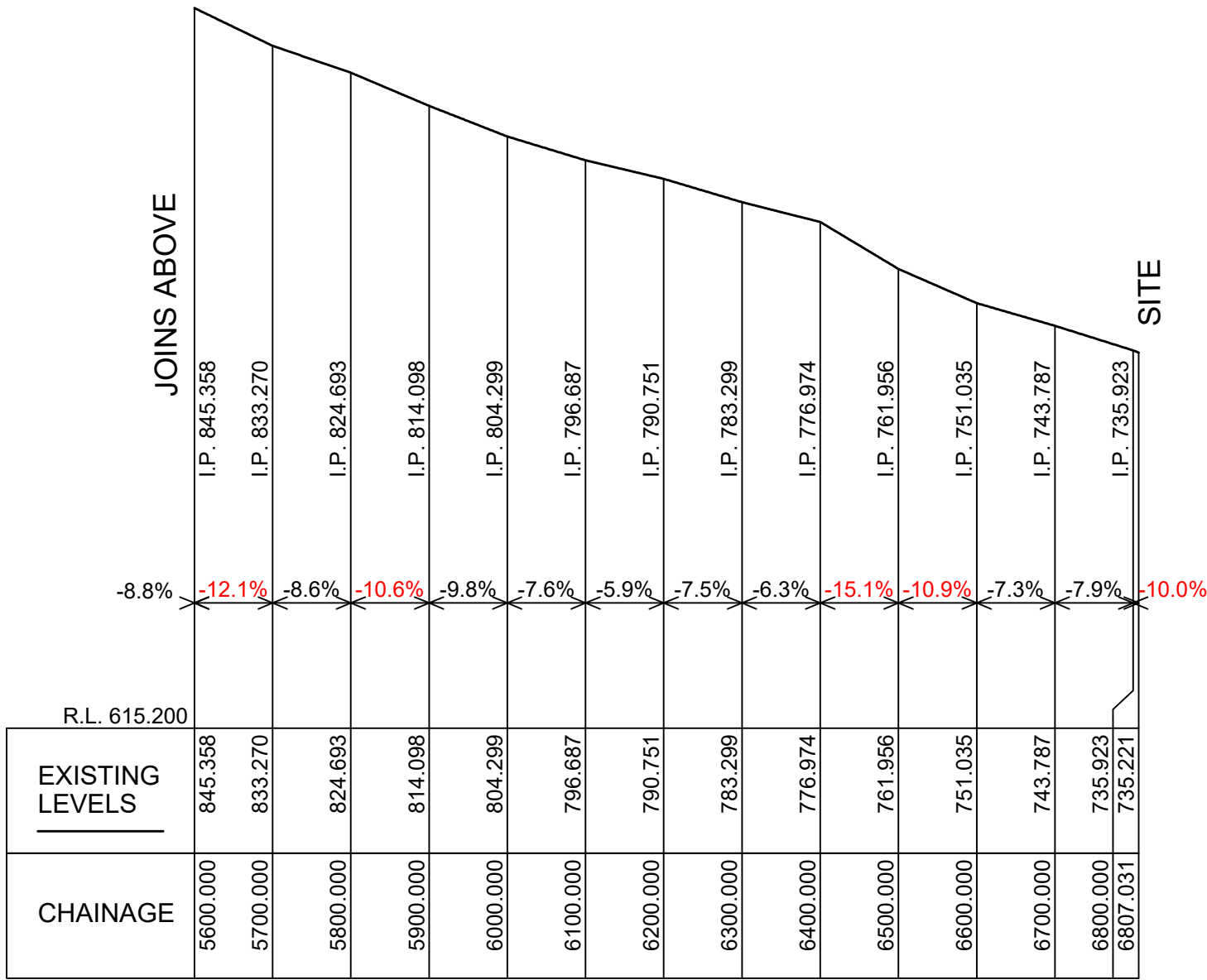


LONGITUDINAL SECTION
SCALES: HORIZONTAL 1:8000 VERTICAL 1:2000
OPTION 2

NOT FOR CONSTRUCTION



LONGITUDINAL SECTION
SCALES: HORIZONTAL 1:8000 VERTICAL 1:2000
OPTION 2A



LONGITUDINAL SECTION
SCALES: HORIZONTAL 1:8000 VERTICAL 1:2000
OPTION 2A

NOT FOR CONSTRUCTION